



Miniature AT Quartz Crystals

Preliminary Data Sheet

10 MHz to 32 MHz



Features

- ☐ Low-profile hermetically-sealed package
- ☐ Available without leads for hybrid epoxy mounting
- ☐ High shock resistance
- ☐ Excellent aging characteristics
- ☐ Fundamental mode
- ☐ Full military testing available

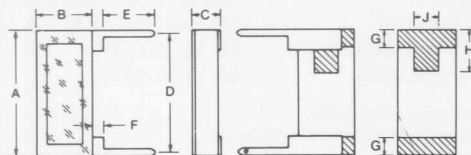
Description

Statek CX AT quartz crystals are manufactured by the Statek-developed photolithographic process. They are available in rugged, miniature ceramic packages.

Standard Frequencies

10.0 MHz	14.318 MHz	24.0 MHz
11.0592 MHz	16.0 MHz	28.0 MHz
12.0 MHz	20.0 MHz	32.0 MHz

CX-1 Series Package Dimensions



DIM	IN.	MM	NOTES
A	0.330	8.38	Max
B	0.155	3.94	Max
C	0.080	2.03	Max
D	0.300±0.01	7.62±0.25	
E	0.125	3.23	Min
F	0.040	1.02	Max
G	0.045	1.14	Nom
H	0.105	2.67	Nom
J	0.060	1.52	Nom

Leads 0.010" x 0.018" (0.25 x 46 mm) nom.

Package Handling

The CX crystal is hermetically sealed in a ceramic package with a soft soldered glass lid and leads. Normal handling and soldering precautions for small low thermal mass parts are adequate when installing or testing CX crystals. Lead-ed CX crystals may be wave soldered with proper precaution taken to avoid desoldering the leads. A slow machine rate or too high a pre-heat temperature or solder bath temperature can damage the crystals. Lead temperature should not exceed 175°C, seal rim temperature should not exceed 210°C. If the seal rim reaches temperatures above the maximum specified, the package may lose its hermeticity. Mishandling of CX crystals can cause cracking of the lid and loss of hermeticity. Excessive shock of unmounted parts can cause damage to the crystal.

Model CX-1 Series

Specifications

Specifications are typical at 25°C unless otherwise noted. Specifications subject to change without notice.

TYPICAL CRYSTAL PARAMETERS

	10 MHz	16 MHz	20 MHz
Motional Resistance R_1 (Ω)	70	20	15
Motional Capacitance C_1 (ff)	5.5	8.7	10
Quality Factor Q	35,000	57,000	54,000
Shunt Capacitance C_0 (pf)	2.5	2.7	3.4

Calibration Tolerance* Calibration A: $\pm 0.01\%$
 Calibration B: $\pm 0.1\%$
 Calibration C: $\pm 1.0\%$

Load Capacitance 20 pf (other available)

Drive Level 500 μ W maximum

Frequency-Temperature

Stability* ** $\pm 0.01\%$ -20 to 70°C
 $\pm 0.010\%$ -40 to +85°C
 $\pm 0.010\%$ -55 to +125°C

Aging, first year 5 ppm

Shock, survival 3000g, 1 ms, 1/2 sine

Vibration, survival 20g rms, 10-2000 Hz random

Operating Temperature

Industrial -40 to +85°C

Military -55 to +125°C

Storage Temperature -55 to +125°C

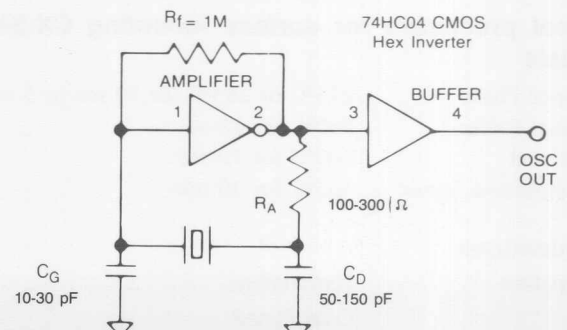
* Tighter tolerance available

** Does not include calibration tolerance.

Circuit Design

A conventional CMOS Pierce Oscillator is shown below. The crystal oscillates at a frequency f_0 above the crystal's series-resonant frequency f_s . The crystal is effectively inductive and, in combination with R_A , C_D and C_G in the feedback loop, provides approximately 180° phase shift necessary to obtain oscillation. Typical component values for a Pierce Oscillator using a 16 MHz crystal with a 74HC04 hex inverter are shown below:

TYPICAL APPLICATION AS PIERCE OSCILLATOR Using 74HC04 CMOS Hex Inverter at 5 VDC



STATEK CORPORATION, 512 N. Main, Orange, CA 92668 Telephone (714) 639-7810 Telex 67 8394 TWX 910-593-1355
 A TECHNICORP COMPANY FAX (714) 997-1256

AT-10-30-12/88



Surface Mountable Miniature AT Quartz Crystals

Preliminary Data Sheet

10 MHz to 32 MHz



Actual size

Features

- ☐ Designed for surface mounting using infrared, vapor phase, or wave solder.
- ☐ Low-profile hermetically-sealed package
- ☐ High shock resistance
- ☐ Excellent aging characteristics
- ☐ Fundamental mode
- ☐ Full military testing available

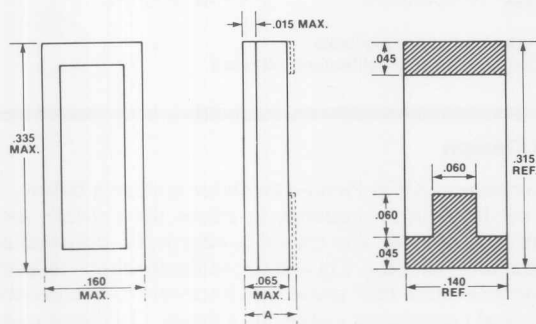
Description

Statek SM AT quartz crystals are leadless devices designed for surface mounting on printed circuit boards or hybrid substrates. They are available in rugged, miniature ceramic packages. Seal rim temperature should not exceed 270°C for surface mount products.

Standard Frequencies

10.0 MHz	14.318 MHz	24.0 MHz
11.0592 MHz	16.0 MHz	28.0 MHz
12.0 MHz	20.0 MHz	32.0 MHz

CX-1-SM Package Dimensions



NOTES:

1. DIM "A" is 0.075" MAX. on solder plated parts.
2. DIM "A" is 0.080" MAX. on solder dipped parts.
3. Plating is not drawn to scale.

Typical processes for surface mounting CX-SM crystals

- | | |
|---------------------|-------------------------------------|
| 1) Vapor Phase | 215°C or 253°C for 10 sec to 5 min. |
| 2) Wave Solder | 260°C for 10 sec |
| 3) Infrared | 240°C for 10 sec |
| 4) Conductive Epoxy | 165°C for 30 min |

Terminations

Designation	Termination
SM1	Gold Plated
SM2	Ni Sn Plated

Model CX-1-SM Series

Specifications

Specifications are typical at 25°C unless otherwise noted. Specifications subject to change without notice.

TYPICAL CRYSTAL PARAMETERS

	10 MHz	16 MHz	20 MHz
Motional Resistance R_1 (Ω)	70	20	15
Motional Capacitance C_1 (ff)	5.5	8.7	10
Quality Factor Q	35,000	57,000	54,000
Shunt Capacitance C_0 (pf)	2.5	2.7	3.4

Calibration Tolerance* Calibration A: $\pm 0.01\%$

Calibration B: $\pm 0.1\%$

Calibration C: $\pm 1.0\%$

Load Capacitance 20 pf (other available)

Drive Level 500 μ W maximum

Frequency-Temperature

Stability* ** $\pm 0.01\%$ -20 to 70°C

$\pm 0.010\%$ -40 to +85°C

0.010% -55 to +125°C

Aging, first year 5 ppm

Shock, survival 3000g, 1 ms, 1/2 sine

Vibration, survival 20g rms, 10-2000 Hz random

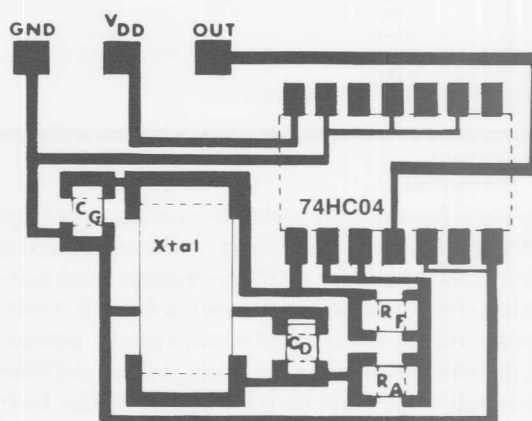
Operating Temperature -40 to +125°C

Storage Temperature -55 to +125°C

* Tighter tolerance available

** Does not include calibration tolerance.

Typical Circuit Layout



Packaging

CX-1

- 16mm Tape, Double Pitch, 7" or 13" Reels, EIA 481A
- Tray Pack
- Bulk Pack

